Editorials

Diseases Desperate Grown

Diseases desperate grown by desperate appliance are relieved, or not at all.

WILLIAM SHAKESPEARE
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WE HAVE A desperate disease in America: neglect of our children. We know that

- One of five children in the United States lives in poverty[1];
- 3.5 million children go to bed hungry[1];
- About 3,000 adolescents become regular smokers every day[1];
- 14% of boys and 13% of girls have been robbed at school[1];
- 3 million adolescents contract sexually transmitted disease every year.[1]
- From November 1990 to November 1991, the number of teens diagnosed with the acquired immunodeficiency syndrome increased 25%.[2]
- The most recent comparison of our infant mortality rate with the rest of the world's ranked the United States as 23rd, a drop from 20th in 1980.[3]
- Although total infant mortality in the United States dropped in 1990, the gap between African-American and white infants increased.[3]

Marian Wright Edelman, founder and president of the Children's Defense Fund, projected last year that, in America by 1996, if no immediate action is taken,

- 1,080,000 babies will be born at low birth weight;
- 143,619 babies will die before their first birthday;
- 15,856 children aged 19 or younger will die by firearms;
- 3,600,000 infants will be born into poverty.[4]

The children are not at fault. No one can blame a baby for having a low birth weight. In fact, blame is not the issue at all. The issue is, where do we go from here?

At bedrock, we need to believe that a society's worth is measured by the way it treats its most vulnerable members. Children are vulnerable. To advance vigorously, we need to agree that children are not only at risk but are also important. They are not necessarily more important than any other group, but they are important. They require attention and care. They are the future. There is a certain practical 1990s application of William Wordsworth's "The child is the father of the man." And that is, according to James Garbarino, PhD, a specialist in preventing and treating child abuse, "If we don't deal with the adolescents as victims, we will ultimately have to deal with large numbers of them as perpetrators."[5(p3)]

We need to understand the forces behind the data. Biology, psychology, and social factors such as family structure are important. Sometimes, frankly, because of inadequacy, selfishness, or worse, parents and others let children down, abandon them, do not meet their needs, reject them, ignore them, and otherwise hurt them. Children may be bereft of a strong sense of self, healthy body, an uplifting spirit. Poverty, poverty, poverty is not the only determinant, but it is a multiplier in many health problems of children. Children from low-income families have double the incidence of low birth weight, bacterial meningitis, and severe iron deficiency and triple the frequency of delayed immunization and lead poisoning.[7] Poverty, lack of education, and inadequate health care, housing, and nutrition are linked.

Although we need more information and analysis, we should push ahead now, doing the best we can. The stakes are high. Children are starting to smoke, drink, and use other drugs, on average, when they are 12 years old; the number of adolescents between 10 and 14 years of age will increase by more than 16% during the 1990s.[8]

We have learned that laws do not always deter. They do not stop young people from obtaining our number one killer, tobacco. A recent study of teenagers' access to tobacco products in Texas showed that signs required by state law were rarely posted and their presence did not prevent purchases anyway: most teens were still able to buy cigarettes.[8] If laws are not the whole answer, the mere presence of information and services is not, either. Rather, as David Hamburg, MD, president of the Carnegie Corporation, points out in this issue,[9] we need early, full, coordinated efforts by virtually all our institutions. We need to give attention to each child, not only "children" as an impersonal classification.

Can we do it? Can we relieve our desperate disease of neglected children? Can we put our shared values into action? Can we harness our spirit? Edith Wharton said, "There are two ways to spread the light: to be the candle or the mirror that reflects it."[10] Hamburg has illumined a reasonable, achievable way to save our children. Let's glow.

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Predicting Outcome From Mechanical Ventilation

MANY ASPECTS OF traditional medical practice are undergoing fundamental change. Physical diagnosis, histori-

cally an intimate act performed with a minimum of technology, is increasingly based on elaborate laboratory testing, invasive diagnostic procedures, and computerized images. Prognosis, always an important but traditionally an informal aspect of a physician's consultation, is also being transformed into a more objective process using large databases and advanced statistical techniques.[1] The predictions resulting from such analyses, however, are neither as widely available nor as universally accepted as computed tomographic scans.

Like physical diagnosis, however, medical decision making is a combination of deduction—reasoning based on past experience—and intuition or professional judgment. When all of the diagnostic and therapeutic capabilities that physicians controlled were contained within a small leather bag, the consequences of physicians' decision making and their estimates regarding prognosis had little influence on the course of patients' illnesses and were of only minimal interest to society. Today's physicians are able to provide a wide range of useful and desired treatments that are likely to directly influence patients' outcomes. Choosing the most appropriate treatment from the wide variety available is increasingly difficult, but the consequences of such choices are growing.[2] Medical services now account for a seventh of this nation's economy, and decisions regarding appropriate use are of substantial interest to payers, politicians, and the general public.

How should physicians respond to these fundamental changes? Should they continue to rely solely on informal individual skills of prognostication for the deductive part of their medical decisions? Or should physicians investigate the value of more formal and objective techniques for estimating who may benefit from advanced medical care?

In this issue of the journal, Papadakis and colleagues report the findings of a Department of Veterans Affairs (VA) cooperative study on mechanical ventilation that provides important background to this discussion.[3] The study is a straightforward report of prognostic factors following mechanical ventilation for 612 medical patients admitted to the intensive care units (ICUs) of six VA medical centers. The results from this survey can be viewed from a number of different perspectives, but in this editorial, I will comment on what they mean in terms of the need for improved prognostic capabilities of physicians and health care systems.

The overall outcome results are striking: more than two thirds of the 612 patients died in the hospital, and by one year the death rate reached 77%. This means that for most patients admitted to ICUs, mechanical ventilation and associated intensive care were ineffective. At least three important consequences derive from this pattern of patient and treatment selection.

First, it means that many of these patients died attached to a ventilator. Having witnessed hundreds of such deaths in my 15 years as codirector of a medical-surgical ICU, I can attest that this is, at best, an impersonal way to end one's life. Normal communication is impossible, and the ventilator intrudes on family relations and personal dignity. I, and most of the American public, do not wish to die attached to a ventilator.

Second, it is detrimental to treating clinicians. Inserting tubes and placing a patient on a ventilator, and then restraining and sedating them so they "stay on the machine," are among the most aggressive forms of treatment provided by medical professionals. When it fails to achieve success in two thirds of the attempts, an ICU staff's morale decreases and their cynicism increases. This then adversely affects the care of other patients.

Third, it uses expensive and limited human and material resources. With all of the current attention in Washington focusing on the reform of our health care system, much is being said of administrative waste and efficiency. Knowledgeable observers such as Aaron and Schwartz emphasize, however, that any such potential savings are small and temporary compared to the larger ongoing costs associated with new technology-dependent treatments of illness.[4] The pattern of care described by Papadakis and associates is a good example of the challenge described by Aaron and Schwartz. It is also an example of expensive treatment provided to a few patients near the end of their lives. This is an important contributor to overall medical care costs and a complicated issue for physicians and policymakers.[5]

Some of the ways we might begin to look for assistance are suggested in this VA study. The authors report that short- and long-term death rates for subgroups of the population, defined by either age, severity of illness, or the initiation of mechanical ventilation following cardiac arrest, were as high as 91% and 98%. Could such estimates improve the precision of such difficult decisions as initiating mechanical ventilation? Two studies have suggested that such objective estimates may be useful in reducing the level of care for patients unable to benefit without decreasing the intensity of care provided to patients with better prognoses.[6,7] A recent study that focused on patients with head trauma found a substantial reduction in the number of patients with poor prognoses who were intubated and mechanically ventilated. More such evaluations need to be done.

In endorsing and conducting these studies, we must always recognize that these "high-cost/high-mortality" patients are among the most vulnerable members of our society. Medical determinations of priorities for care should be based on the best comprehensive analysis of medical evidence, not simple and incomplete summaries. Cohen and associates recently suggested using a combination of age and the duration of medical therapy to estimate likely benefit.[8] Although such estimates may assist in reducing the duration of mechanical ventilation, they would do little to decrease the proportion of patients dying on a ventilator. It is also inappropriate to use age as the only patient characteristic in a criterion for withholding or withdrawing ventilatory support. Our experience and research have convinced me that age is an important but relatively minor contributor to predicting outcome. Severity of illness is a far more important factor.[1] Basing

any decision to offer therapy on a single patient characteristic is neither necessary nor appropriate.

Estimates of prognosis can now be supported by large and current databases involving thousands of patients and containing a combination of medical facts on each person. Taken together, these facts—severity of illness, physiologic reserve, response to therapy—summarize a patient's ability to benefit from further treatment. Analyses of these facts can be displayed in numerical form, such as probability estimates with appropriate confidence intervals. These numerical estimates can then be combined with an assessment of other patient characteristics, particularly personal preferences and individual values, in a comprehensive attempt to arrive at the best possible treatment decision for a particular patient.

Papadakis and colleagues caution that their study does not provide this type of comprehensive analysis, nor do they endorse their results as providing guidance about who can and cannot benefit from mechanical ventilation. This caution is appropriate. Large contemporary clinically accurate databases are still not widely available. The database used in this analysis, while specific to VA patients, is now old, having been collected in 1986 and 1987. Because they have never been a part of medical reasoning, objective individual probability estimates currently lack precise meaning for most clinicians. Much work needs to be done in both developing estimates and learning how to best integrate them into clinical decisions. The introduction of such explicit numerical probabilities into medical decision making will inevitably change the nature of prognosis. They will not, however, provide definitive guidance. At best, they will increase the recognition that there are always alternatives and will prompt discussions of the value expected from treatment. It is hoped that they will also increase our knowledge and promote better communication among physicians, patients, and their families. Of course, numbers are not sufficient to address the complex challenge presented by the results of the study by Papadakis and colleagues. The wisdom and intuition that a good clinician needs to make better decisions contain many components. Prognostic capacity is only one aspect of this complicated process, but it is a place to start looking for improvement.

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Role of Platelet Adhesion and Aggregation in Antithrombotic Therapy

GEORGE M. RODGERS, MD, in this issue of the journal reviews antithrombotic therapy, old and new.[1] It is a field in rapid expansion, after years of relative stagnation dominated by heparin, warfarin, aspirin, and not much else. It is not unusual, when introducing the topic of future anticoagulants, to refer to ticks, leeches, snakes, and vampire bats (the sources of some of the drugs currently in clinical trial), perhaps as a way to signify that new directions are being pursued with unlimited imagination. Yet, the new drugs for the beginning of the next millennium will likely be designed for the purpose and not be derived from natural products, as exotic as these may be. The reasons to support this concept have begun to emerge from studies on the mechanisms of normal hemostasis and pathologic thrombosis: these two processes may be sufficiently different to allow some degree of selective inhibitory intervention; and, certainly, natural antihemostatic substances did not develop in nature to prevent thrombosis but to block clotting. Thus, natural products are not likely to target specifically those functional aspects that distinguish the formation of an occluding thrombus in a diseased artery from the formation of a hemostatic plug in a normal small artery or capillary. Future drugs, with maximal antithrombotic efficacy and minimal hemorrhagic side effects, will be keyed to inhibiting these distinctive pathways. As a corollary of such developments, because hemostasis and thrombosis are complex events, it is easy to predict that there will be several new drugs, each effective in a selective manner. They will be used in varying combinations rather than alone, depending on the nature of the underlying disease process and the area of the vasculature at risk of occlusion. Prevention, rather than the treatment of ongoing or established thrombosis, will be the main goal; and specific drugs will be used to protect people from the risks of vascular occlusion, different from those used to dissolve clots and avoid reocclusion.

Is this picture likely to become reality in the not-too-distant future? Perhaps, as suggested by the intense interest demonstrated by several investigators in the field. The market for new antithrombotic agents is large, being estimated in excess of 5 million patients per year in the United States alone; this should ensure the continued support of research efforts from drug companies. The areas of application that generate the most interest, reflecting the incidence and potential severity of the various thromboembolic diseases, are the ones that may involve platelets and the arterial side of the circulation. In other words, new antithrombotic drugs are being sought for use in the prevention and treatment of coronary artery